

ABSTRACT OF THE DISCLOSURE

A shallow trench isolation (STI) structure and fabricating method thereof is provided. A substrate is provided. A patterned mask layer is formed over the substrate. Using the patterned mask layer as an etching mask, the substrate is patterned to form a
5 trench. A nitridation process is performed to form a silicon nitride liner on the surface of the trench. An insulating material is deposited to fill the trench. Since the silicon nitride liner within the STI is very thin, residual stress within the substrate is reduced, and the silicon nitride liner has very little or negligible impact on the trench aspect ratio.